



## Risks and Decisions: How We Live and Farm

In our last bulletin, we discussed the regulatory framework that the United States uses to evaluate genetically engineered crops. Are these regulations too lax? Too restrictive? Appropriate for current circumstances? Before we examine issues of biotechnology and safety, we'll consider the process by which people assess safety in their daily lives.



If you had some free time and a ticket, would you get on a plane and fly to Maui? The plane could crash! Luckily, we know that plane wrecks are quite rare, so we go ahead and fly. Should you swim in the ocean, or sit on the beach in the sun? There may be sharks. Still, the odds of a shark attack are very, very small, so we swim, surf, and enjoy ourselves.



Excessive sun exposure can cause skin cancer years after exposure. Living in the environment we do, it is often tempting to just not worry. You never got skin cancer from the sun before..... but the effects can take a long time to be seen as cancer. We can manage the risk of course – use sunscreen to reduce the chances of skin cancer. Don't lie in the sun at the hottest times of day, and all those sensible precautions. There is a need to strike a balance – too little sun is bad; too much sun is bad!



It all comes down to assessing and managing risk. Risk is an estimate of how likely a particular hazard is to occur and how harmful the hazard would be. There are risks inherent in everything we do, and we weigh risks and benefits every day. For most of us, the benefits of a plane ride or a beach day outweigh the risks.

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# Risk Assessment

In geographically isolated Hawaii, we frequently use risk assessments to evaluate potential invasive insect pests and plant pathogens. Which new pests and diseases are most likely to be imported on produce coming from the mainland?

Of those, which are most likely to become established here?

Understanding the biology of pest species and how they might interact with our environment allows authorities to formally evaluate the chances and consequences of particular species becoming an undesirable introduction.



## Managing Crops



Risk is also a factor in managing crops. Let's say your tomatoes are being attacked by aphids, sap-sucking insect pests. The aphids are acting as disease vectors, transmitting a virus when they feed on your plants.

## The What Ifs

Should you spray an insecticide or rely on biological control agents? How likely is either option to work? What will happen if no action is taken? What are the long-term implications? What can go wrong?



## Making Decisions



The virus will kill the crop, so failure to act carries a very high price. At the same time, the insecticide may kill off the aphid-eating ladybugs you usually depend on for pest control. What will happen if you spray to control the disease vector and also plant a companion crop that attracts ladybugs back to your farm? The risks of each activity are evaluated, the potential outcomes are considered, and in the end an informed decision is made.



This approach can be extended to any new agricultural technology, including pesticides, biological control agents, and genetically engineered crops. Before proceeding, we ask ourselves:

- What hazards does the technology pose to the environment or to human health?
- How likely are those hazards to be realized under various circumstances?
- How severe will be the outcomes be if these hazards are realized?

Armed with these questions, we're ready to examine the safety of genetically engineered crops in greater detail.